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MINERAL ELEMENTS AND VITAMINS COMPOSITION OF FLAVOURED MILK.

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ABSTRACT
Flavored milk drink commercially sold in Zaria- Nigeria was analyzed for some mineral elements and vitamins composition. The Atomic Absorption Spectrophotometric analysis was used for mineral elements. Vitamin and protein contents were carried out using the UV- visible spectrophotometric. The result showed the presence of some mineral elements of which sodium was highest 5.4- 0.95 mg/l and copper had the lowest value of 0.03-0.01 mg/l. Among the vitamins, vitamin E had the highest value of 4.4- 2.7 mg/ml and vitamin B2 was highest 0.05- 0.02 mg/ml protein content was found to be 2.20-0.05 mg/ml. There were no significant changes in the values at different retail times.

KEYWORDS: Mineral elements, Vitamins, Proteins and Milk.

INTRODUCTION

Milk has been defined as an emulsion of fat globules in a suspension of casein miscelles all suspended in an aqueous phase which contains solubilized lactose, protein and mineral salts (Akpanyung, 2006). It is a natural secretion of the mammary glands, which plays a fundamental role in nutrition, growth, development and immunity (Cashman 2006). Several studies have reported the distribution and occurrence of the essential components in various milk drinks and this revealed that the component contents of selected milk products vary considerably and that their composition appears to be affected by genetics, physical and environmental factors (Enb *et al*., 2009).

Minerals are one of the nutrient groups vital to the human body. Minerals, like vitamins, are chemicals that the human body needs to function properly. Milk products like flavored milk drink are among the most diversified in terms of composition, and could contains more than twenty different trace elements and most of them are essential and play a very important role in many physiological functions in humans (Birghila *et al*., 2008). These various components may vary in the same flavored milk product supplied at different retail times in the same location.

Therefore, in other to survey some retailers of flavored milk product, the objective of this study was to determine some mineral elements, vitamins and proteins in flavored milk drink sold in Zaria – Nigeria at different retail times, this is to provide evidence considering the claims by manufacturers that the quality is the same for every product at any given point in time.

MATERIALS AND METHODS

Different brands of flavoured liquid milk drink were randomly purchased from Zaria market Kaduna State Nigeria from the retailers at 3 different times in June (A), July (B) and August (C) 2010. Wet digestion of the samples was carried out by mixing sample: Nitric acid: Sulphuric acid (9:0.5:0.5) and heated for 30 minutes until a clear solution was obtained. The mixture was filtered and diluted in 90ml distilled water before analyzing for mineral elements by Atomic Absorption Spectroscopy (Vogel, 1961) with graphite furnace.

Subsequent, the vitamin analysis was carried out by weighing 2g of each milk sample into 10ml of methanol and heated at 40^{o}C for 10 minutes. This was filtered and the filtrate was analysed for vitamins using an automated Shidmazu UV spectrophotometer. The protein content was quantified as described by Bradford 1976using each milk sample of five samples each collected as described earlier.

RESULTS AND DISCUSSION

The result obtained showed that eight mineral elements were detected in which sodium was highest at 5.40 ± 0.95 mg/L and copper was lowest at 0.03± 0.01 mg/L. Potassium and Cadmium were not detected (Figure 1). The result shows that each of the elements is approximately at the same level when collected at three different times first (A), second (B) and third (C) times.

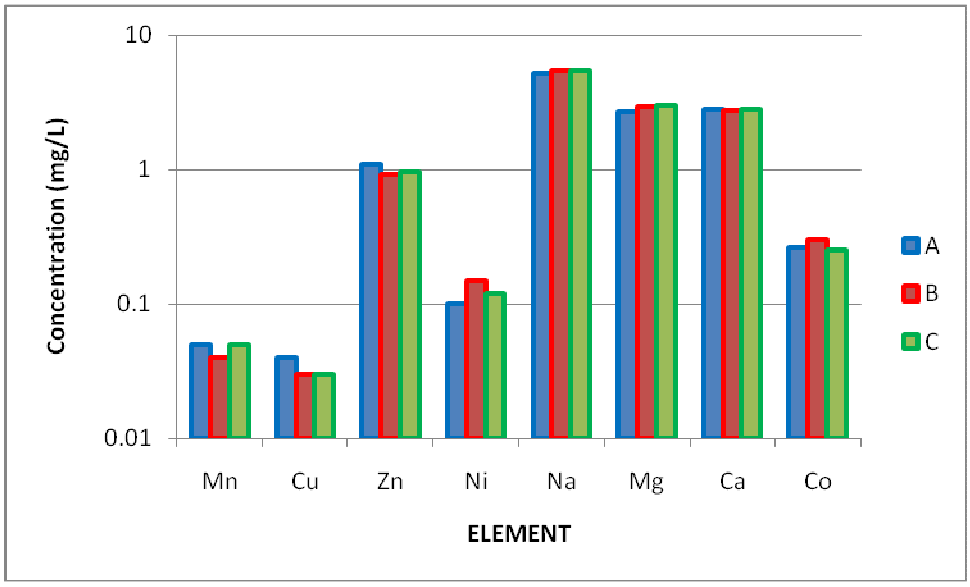

Figure 1: Mineral element composition of flavored liquid milk drink collected at 3 different times A, B, and C i.e. first, second and third collections respectively.

The vitamins and protein determination showed that vitamin E was highest at 4.40 ± 2 .70 mg/ml and Vitamin B2 was 0.05 ± 0.00 mg/ml. Vitamin A was not detected in all the samples. The protein concentration was found to be 2.20± 0.05 mg/ml on first collection (Table 1) and was 2.00 and 2.15 when samples were purchased the second time and third time respectively. Vitamin C and Vitamin M were found to be present in the milk sample purchased at three different times.

Table 1: Vitamins and protein content in flavored liquid milk drink collected at three different times.

Parameter	A (mg/ml)	B (mg/ml)	C (mg/ml)
Vitamin C	1.80 ± 0.08	1.75 ± 0.05	1.70 ± 0.05
Vitamin E	4.40 ± 2.70	4.45 ± 2.00	4.00 ± 2.500
Vitamin B2	0.05 ± 0.00	0.05 ± 0.02	0.04 ± 0.06
Vitamin M	1.90 ± 0.11	1.88 ± 0.15	1.80 ± 0.15
Vitamin A	N.D	N.D	N.D
Protein	2.20 ± 0.05	2.00 ± 0.05	2.15 ± 0.08

ND= no detection.

The vitamins are required in small amounts for the maintenance of normal metabolic integrity (Chukwujindu *et al*; 2008). The presence of vitamins B2, C, E, and M in small amounts in the flavored milk drinks analysed

(Table 1) could support essential metabolic functions which are generally required in small amounts in the diet because they cannot be synthesized by the body (Murray *et al*., 2003). Many minerals in milk are also essential nutrients that play important roles as structural constituents and in the regulatory functions of body fluids (Park *et al*., 1994).

Some mineral elements were present in the flavored milk drink and this will provide essential functions to the consumers. Manganese, Sodium, Calcium, and Magnesium play a regulatory role in hormone functions (Akpanyung, 2006 and Habila *et al*., 2009).

Sodium and Potassium are also known to be involved in membrane function and are the principal cations of extracellular and intracellular fluids, respectively (Stryer *et al*., 2000). Cobalt, Copper and Zinc function as prosthetic groups in enzymes (Murry *et al.*, 2003).

Overall, the study revealed that the level of the elements, Vitamins and protein analysed are relatively consistent even though the samples were collected at different retail times from different suppliers.

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